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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,155	07/16/2003	Marvin I. Fredberg	RAY-133J	1204
7590 11/18/2005			EXAMINER	
Iandiorio & Teska 260 Bear Hill Road Waltham, MA 02451-1018			WIMER, MICHAEL C	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 11/18/2005

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/621,155
Filing Date: July 16, 2003
Appellant(s): FREDBERG ET AL.

MAILED

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GROUP 2800

Thomas E. Thompkins, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 25 August 2005 appealing from the Office action mailed 10 February 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,506,269	GREENE	3-1985
5,360,503	COFFY	11-1994

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over

Greene (45026269) in view of Coffy (5360503) as set forth in the final rejection.

Specifically, regarding Claims 1,2,12,13,22 and 24, Greene shows a method of producing a radome 10 (Prior Art Fig. 1) comprising at least one rigid panel 13 or 15 (Figures 3 & 4) with an outside skin 14 comprised of polyarylate. No

polyester-polyarylate fiber construction appears to be suggested. Thus, Coffy is cited as evidence of obviousness and as resolving the level of ordinary skill in the art and teaches in EXAMPLE 1 in col. 6, line 50 to col. 7, line 5, a composition of polyester-polyarylate fibers in a rigid matrix material and having remarkable transparency to EM waves, and thus excellent for radomes. It would have been obvious to the skilled artisan to employ such a composition in the skin of the radome in Greene for forming the radome with the excellent qualities set forth.

Regarding Claims 3,4,14 and 23, it would have been obvious to form the inner and outer skins in Green with the material composite of Coffy with the low-density core 22 of Green.

Regarding Claims 5-10,15-20, the specific materials recited here for the resin composition would have been obvious to the skilled artisan as they are common engineering materials available for resin matrix structures.

Regarding Claims 11 and 21, the denier number for the fibers would have been obvious to the skilled artisan since it depends upon the specific composition of materials and the strength desired in a particular design.

(10) Response to Argument

At the outset, it is noted that there are two points of discussion unrelated to the issues of the obviousness rejection, related as to matters of form in which Appellant includes in this Brief. The first point is in regard to Appellant's mention of the co-pending application under section "II RELATED APPEALS AND INTERFERENCES" found on page 1 of the Brief. This required section "II" of the Brief mentioning a co-pending application is not the proper forum.

The second point of discussion involves the inclusion of a picture of a large radome within the required section "V. SUMMARY OF THE CLAIMED SUBJECT MATTER" found on page 2 of the Brief, and a full copy page of this radome example included in the EVIDENCE APPENDIX. This picture is cited only as an example of a radome and does not add any new evidence or argument in this case because the basic radome construction, materials and definition are all found in the Greene patent.

Several issues have been raised in the Brief and they will be addressed in the order that they appear, as follows.

Appellant's arguments begin on page 5 and end on page 20 of the Brief.

In the sentence bridging pages 5 and 6 of the Brief, Appellant states that Greene considered polyarylate material and rejected it in favor of a polycarbonate material, and that fibers in a rigid resin matrix material was not considered by Greene. However,

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more importantly, Greene considered such a material for a particular application within particular design parameters, and chose another material. That does not preclude the use in a radome of the polyarylate material taught in Greene, particularly since Greene actually does desire such a material in some applications, where it is tolerable in a specific environment in which the radome is employed, and specifically since Greene claims a polyarylate material as part of a Markush group in his Claims 1 and 4. The material is used in radomes such as in the construction of Greene's radome because it is suggested in an example and claimed therein. In Greene, TABLE II, found in column 6, shows specific radome materials and specifically illustrates that polyarylate has "Very Good" rain erosion performance (one of the parameters in which Greene didn't believe such a material was adequate in his "rain impact requirement", such as used in a supersonic aircraft at speeds greater than Mach 1 (described in the paragraph bridging columns 3 and 4 and col. 4, first paragraph of Greene)). Greene chose the polycarbonate material because it has "Excellent" rain erosion performance used within the environment set forth therein and within the parameters "able to meet electrical, rain impact and the aerodynamic load requirement" (col. 4, first paragraph). Appellant fails to address what a skilled artisan would be confronted with, namely specific design criteria, in a particular environment. The environment in Greene is particularly harsh since it is used at great speeds and at high altitude where the weather environment is particularly important. The skilled artisan on the other hand is also confronted with designing radomes of a material that cover small TV dish antennas, repeater antennas and general purpose antenna elements where rain erosion is not the

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most important environmental concern. Thus, the use of polyarylate material is a very good choice. Appellant clearly and correctly points out in the Summary of the Claimed Invention, regarding the function of a radome, page 2 of the Brief, that the radome and its material should not interfere with the signals. Thus, a major requirement of radome design is that it readily pass electromagnetic energy so as not to significantly attenuate the radio frequency signals emitted from or received by the antenna within the radome. The skilled artisan would choose a radome material that has “remarkable transparency to electromagnetic waves”, as specifically pointed out in the patent to Coffy having the construction and materials set forth in his EXAMPLE 1. Appellant also correctly points out that there are engineering compromises made in radome design between a rigid environmental protective housing and the electromagnetic (EM) attenuation issue, where tradeoffs always occur in design. Radomes are used in all environments, including indoors, outdoors, space and within shelters that may not receive direct rain. Thus, according to Greene, a polyarylate material is a wise choice, by the skilled artisan, to employ in radome design because as TABLE II illustrates that polyarylate is “very good” relative to rain performance. In ground-based, non-supersonic applications, the skilled artisan would certainly choose such a material for a radome given the benefits outlined in the table of Greene and Coffy’s admission and recognition that polyarylate fibers in a matrix polymer, produced as in EXAMPLE 1 therein provide a composite material that has remarkable transparency to electromagnetic waves. EXAMPLE 1 of Coffy uses VECTRAN® fibers for forming the matrix polymer and for composite material reinforcement. In the sentence bridging pages 5 and 6 of the Brief,

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Appellant claims Greene did not consider polyarylate fibers in a rigid matrix material for his radome. However, that is precisely the reason the Coffy reference was applied in an obviousness rejection, where evidence of obviousness is shown. Greene does illustrate the prior art by way of Figures 1 and 2 therein. Quartz fibers in a resin matrix are used therein for defining a radome structure. Appellant argues on page 6 of the Brief that no radome is specifically suggested by Coffy. But, the material in Coffy has characteristics such as remarkable transparency to EM waves, the material may be employed in the fields of avionics, aeronautics, car, space, etc. (col. 1, lines 24-29), and the material may be made as a fabric with fibers in a laminate (col. 4, lines 4-68) and later chosen to be molded forming a rigid matrix. The liquid crystal polymers of Coffy are produced so a skilled artisan may purchase them in a fabric, thermoplastic fiber matrix for producing a final product. A skilled artisan would thus look to Coffy for producing a radome protective cover that passes EM waves freely without attenuation while providing structural integrity for a particular environment and highly resistant to sunlight so as to avoid deterioration.

In the paragraph bridging pages 6 and 7 of the Brief, Appellant correctly sets forth what is known in both patents to Greene and Coffy. In the arguments to the combination of these references (page 7 of the Brief), Appellant states that hindsight reconstruction is used along with Appellant's disclosure, and that there is no proper analysis regarding obviousness. However, since the material, polyarylate, is used in radomes, such as in Greene, the polyester-polyarylate fibers in a resin matrix, sold as VECTRAN®, and set forth in EXAMPLE 1 of Coffy is motivation to combine and use as

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a radome, as disclosed by Greene, either in his Prior Art Figures 1 & 2 or his invention, since Greene claims polyarylate material in a radome and Coffy recognizes that his EXAMPLE 1 construction has "the composite material obtained has a remarkable transparency to electromagnetic waves" (Coffy, col. 7, lines 3-5), a parameter and quality so essential in radome design. A skilled artisan would have recognized as obvious that the Coffy composite material may be utilized in the Greene radome construction. Both Greene and Coffy recognize and illustrate materials in avionics and aviation, where radomes are widely employed. Therefore, evidence of obviousness exists.

In the arguments on pages 8-10, analyzing the Greene reference and its teachings, Appellant emphasizes the high-speed use of the radome. However, radomes do not have to be used in aircraft traveling greater than Mach 1. Radomes are constructed to protect the antenna and pass EM waves freely with little attenuation, in a particular environment. The core construction in Greene considers the dielectric constant at a particular frequency of operation. Such considerations are essential to radome design. But, Coffy states that the EXAMPLE 1 construction is remarkable in passing EM waves. Thus, the skilled artisan would have found it to be obvious to employ in the radome construction, such as disclosed by Greene. Greene merely chose polycarbonate because the rain erosion performance was excellent and better than polyarylate in his specific use of the radome. A skilled artisan would choose any of the materials set forth in the Greene table and as set forth in the preamble of claims 1 and 4, particularly as the outside skin of the radome construction.

Appellant sets forth an analysis of the Coffy reference on pages 10-13 and correctly points out the qualities and use of the composite material described. The semi-finished product of Coffy is used in the process to make thermoplastic devices, where they may be molded, heated and the use of applied pressure to form the composite material. Coffy does not have to specifically suggest the material to be used in radome construction. The specific polyarylate is already a material used in radome construction. A skilled artisan must ensure that the composite material readily passes EM wave energy and is of a rigid construction for environmental protection of the antenna within the radome. The Coffy composite construction provides these design goals and parameters.

In the paragraph bridging pages 11 and 12 of the Brief, Appellant argues that the fabric of Coffy is made exclusively of liquid crystal polymers, where interface problems do not arise between the fibers and resin matrix. A skilled artisan recognizes as obvious that such layers of composite material may be employed in the skins of the radome sandwich set forth in Greene, particularly since the polyarylate is used in the skin structure of the radome in Greene (see Greene's Claim 1 and Claim 4). Greene teaches the use of epoxy, for forming the rigid matrix. Coffy uses two different VECTRAN® layers forming a laminate in EXAMPLE 1. The use of the composite material of Coffy in the Greene radome construction provides the various materials claimed here, particularly since Coffy suggests a laminate.

Pages 13-15 of the Brief, in section "D" sets forth arguments to the rejection based on the combination of Greene and Coffy. These patents are not "two

diametrically opposing references” as alleged by Appellant. The use of the composition of Coffy, EXAMPLE 1, would not destroy the sandwich construction of Greene because the former has remarkable transparency to EM waves. Contrary to Appellant’s characterization of Greene, there is a specific motivation to employ polyarylate for the wall construction of the radome because Greene claims such a composition (see Greene’s Claims 1 and 4 as a Markush group). There would not be any interface problems as alleged by Appellant in the Coffy/Greene combination because the composite in EXAMPLE 1 of Coffy eliminates such a problem by using a composite without such a detrimental effect. The core need not be anything more than the cores disclosed by Greene. The material composite in EXAMPLE 1 does not have the prior art issues of interface problems. The material in Coffy is used in radome construction of Greene, although in Coffy there is a matrix with fibers. Although Greene *prefers* polycarbonate, polyarylate is “very good” with respect to rain erosion performance (as set forth in the Greene’s TABLE II), and thus, a skilled artisan would look to a polyarylate wall construction in the radome.

On page 16, section “E” sets forth arguments to dependent claims 5-10 and 16-20. However, the VECTRAN® of Coffy is the material claimed, that is, polyester-polyarylate. Greene does not have to teach a fiber construction of polyarylate, but does teach quartz fibers in the prior art Figures 1 and 2 thereof.

In section “F” on page 16 of the Brief, Appellant presents arguments for Claims 11 and 12. Specific size ranges of the polyester-polyarylate fibers are claimed by

Appellant. Such specific sizes are well within the ordinary level of skill particularly since Appellant has not shown any unexpected results.

On page 17, section "G" presents arguments for Claims 12,13 and 24.

As set forth above, Greene does show a multi-layered construction for the radome, and Coffy suggests a laminate construction, and presents a layered composite construction in EXAMPLE 1. Evidence of obviousness is set forth in the teaching of such a laminated construction. A core along with outer and inner skins is the most basic construction of a radome presented in Greene, both as prior art and his invention.

Pages 17-19 of the Brief addresses arguments in the Advisory Action mailed 17 May 2005. The skilled artisan would look to Coffy, EXAMPLE 1 therein, because it solves the interface problem, provides a rigid structure that has remarkable transparency to EM waves, and all essential to radome construction as set forth by Greene. Greene looks to using skins of the radome made from polyarylate. Coffy merely provides a better construction of a composite material. Greene does mention fibers as quartz in the resin matrix that comprises the skins of the prior art radome therein.

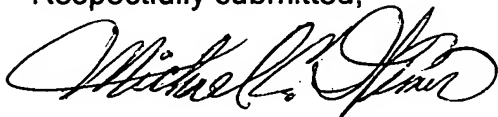
(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

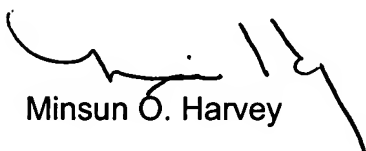
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Michael C. Wimer

Primary Examiner

GAU 2828

Conferees:

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Minsun O. Harvey

Drew A. Dunn 